

FERNALD CLEANUP PROGRESS BRIEFING AUGUST 2002

Environmental Monitoring 2001 Program Summary

Opening Remarks

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Surface Water Monitoring

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Groundwater Monitoring

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On-Site Disposal Facility

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Air Monitoring

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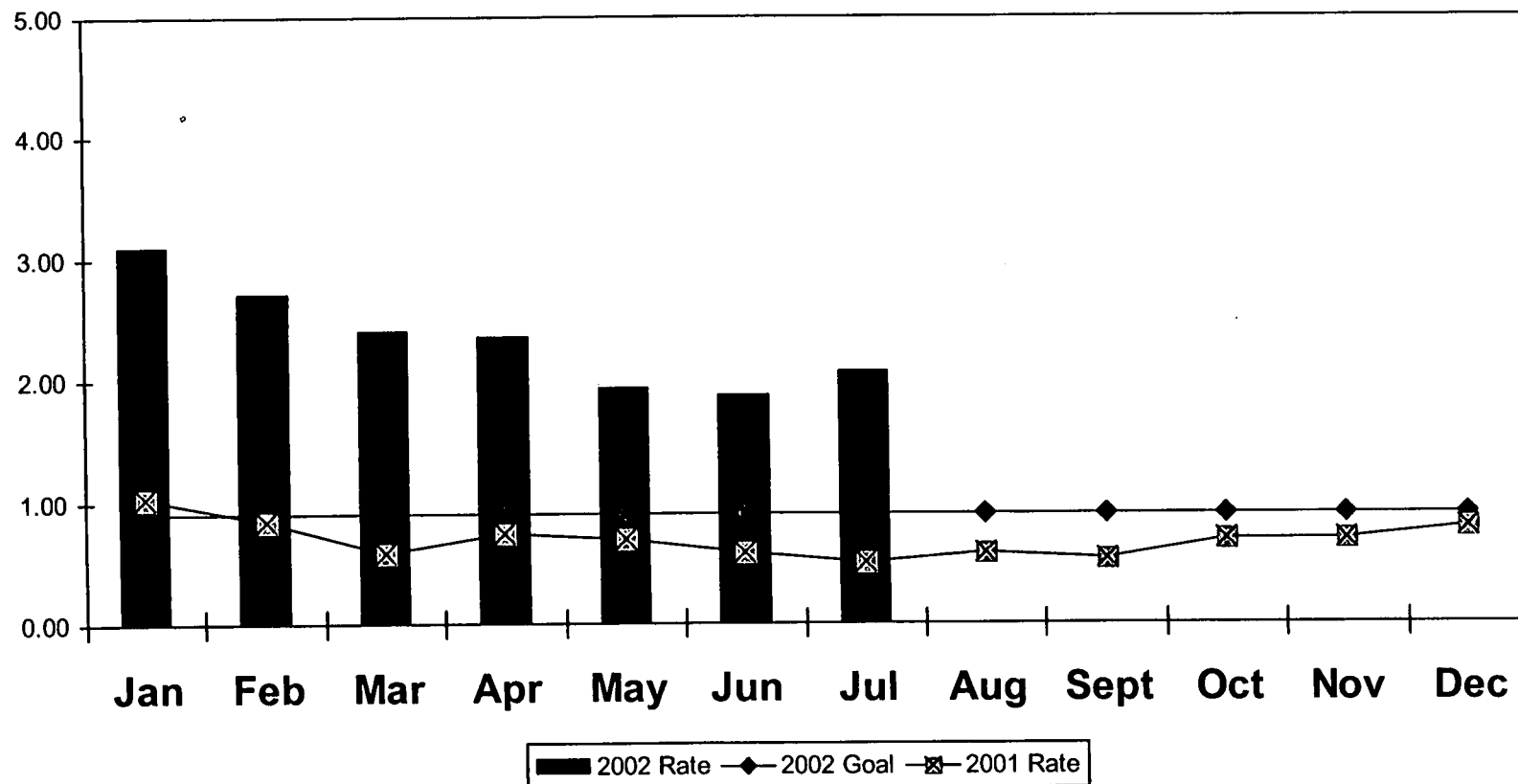
Question and Answer Session



FERNALD

Environmental Management Project

2001 - 2002 OSHA RECORDABLE INCIDENCE RATE



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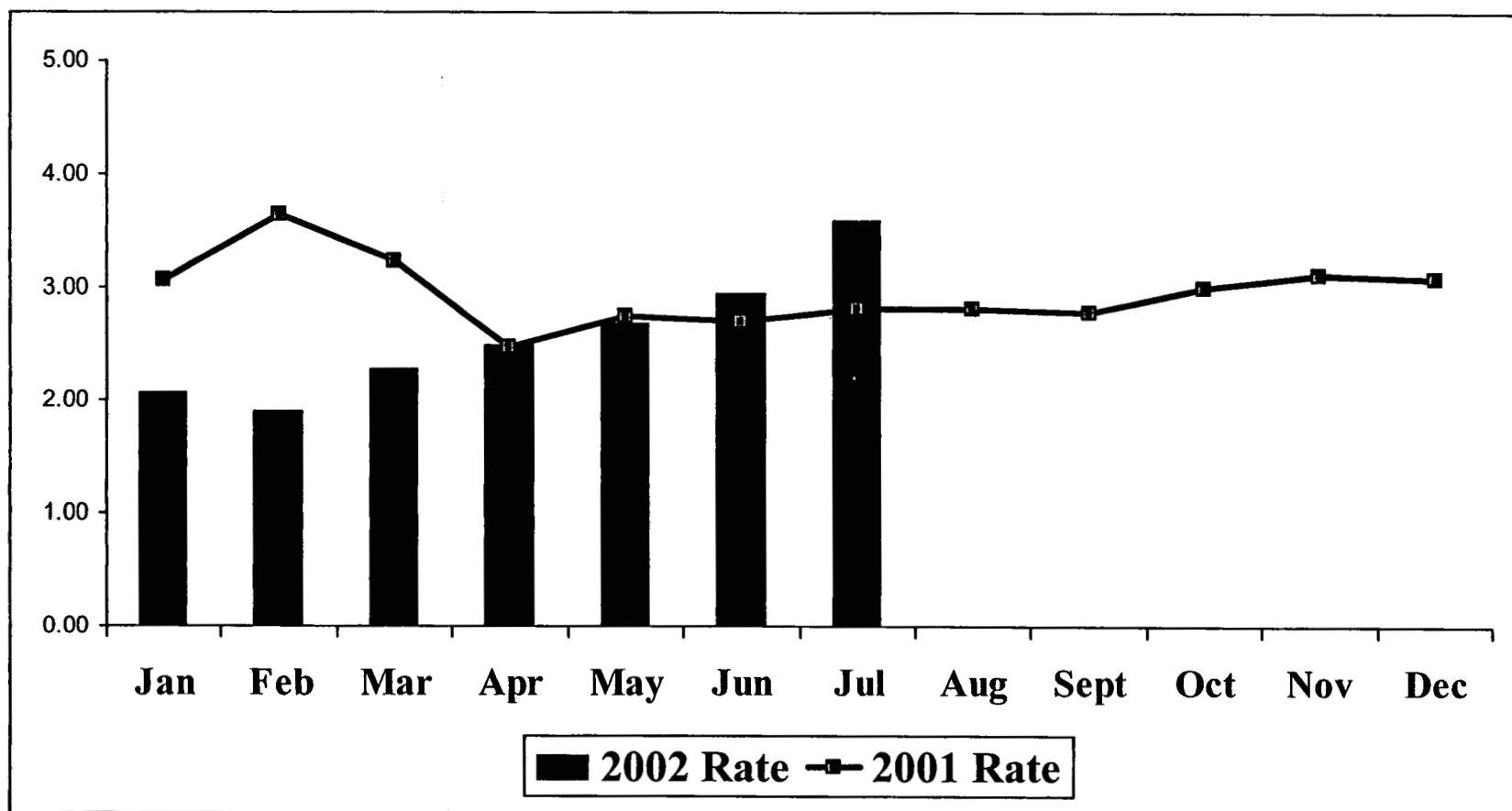
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**FERNALD**

Environmental Management Project

2001-2002 FIRST AID INCIDENCE RATE



ENVIRONMENTAL MONITORING PROGRAM

- **Ensure protection of public health**
- **Ensure compliance with regulatory limits**
- **Provide assessment and continual feedback to remedial action projects**

REPORTING

- **Semi-annual reports (mid-year report in November and Site Environmental Report in July) available in Public Environmental Information Center (PEIC)**
 - ◆ **Site Environmental Report**
 - **Widely distributed and available in PEIC**
 - **Available on internet (www.fernald.gov under Environmental Monitoring)**
- **Cleanup Progress Briefings**

SITE ENVIRONMENTAL REPORT

Contents

- **Executive summary**
- **Site history and background**
- **Remediation status**
- **Monitoring results:**
 - ◆ **Groundwater**
 - ◆ **OSDF**
 - ◆ **Surface water**
 - ◆ **Air particulate**
 - ◆ **Radon**
 - ◆ **Dose assessment**
 - ◆ **Natural Resources**

PROGRAM HIGHLIGHTS

Groundwater Monitoring

- **Groundwater Final Remediation Level (FRL) changed from 20 ppb to 30 ppb**
- **Maintained capture of southern plume both on- and off-property**
- **Extraction systems continue to be effective**
 - ◆ **Decreasing concentrations of uranium observed in western portion of South Field**
 - ◆ **Decreasing concentrations noted in south plume**
 - ◆ **Response east of South Field less than anticipated, prompting installation of additional wells**

PROGRAM HIGHLIGHTS

Groundwater Monitoring

- **Phase I (Pilot Plant drainage ditch plume) Waste Storage Area extraction wells installed and operational as of May 2002**
- **Reinjection well system is operational**
 - **Three of the five rehabilitated injection wells are performing adequately**
 - **Replacing two of the five wells**
 - **Installing one additional reinjection well to enhance system**
- **Monitoring results indicate On-Site Disposal Facility is performing as designed**

PROGRAM HIGHLIGHTS

Surface Water Monitoring

- **No exceedances of the uranium FRL in surface water**

PROGRAM HIGHLIGHTS

Air Monitoring

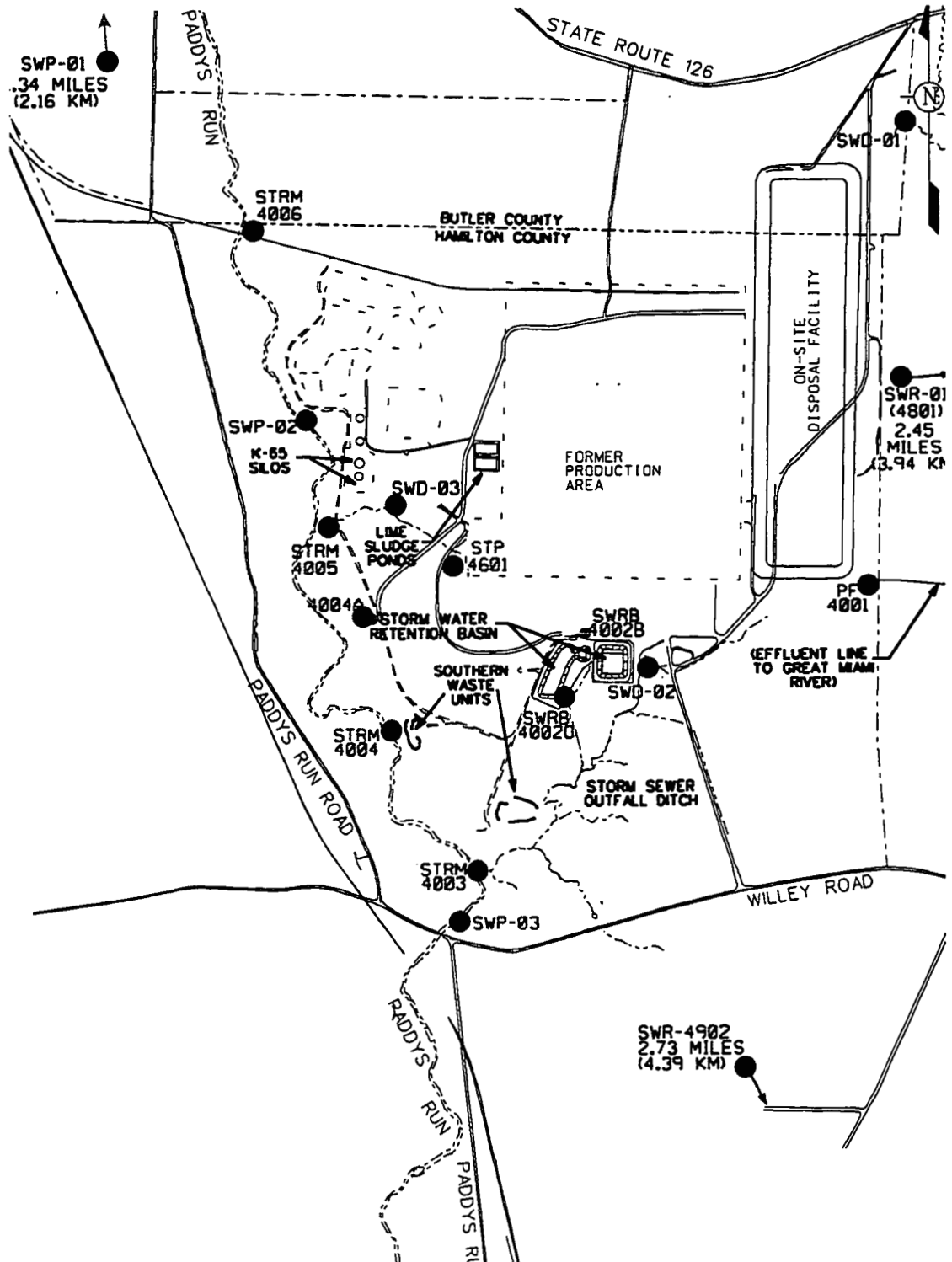
- **2001 radiological dose from air particulate emissions - 0.8 mrem (compare with 10 mrem limit)**
- **Radon levels well below the 3 pCi/L fenceline limit**
- **2001 all pathway dose - 11.7 mrem at nearest receptor location west of site (compare with 100 mrem limit)**

PROGRAM HIGHLIGHTS

Programmatic Changes

- **Decreased frequency of groundwater sampling from quarterly to semi-annually**
- **Decreased paper reporting from quarterly to semi-annually (web-based reporting to EPAs is performed on a continual basis)**

SURFACE WATER AND TREATED EFFLUENT SAMPLING LOCATIONS

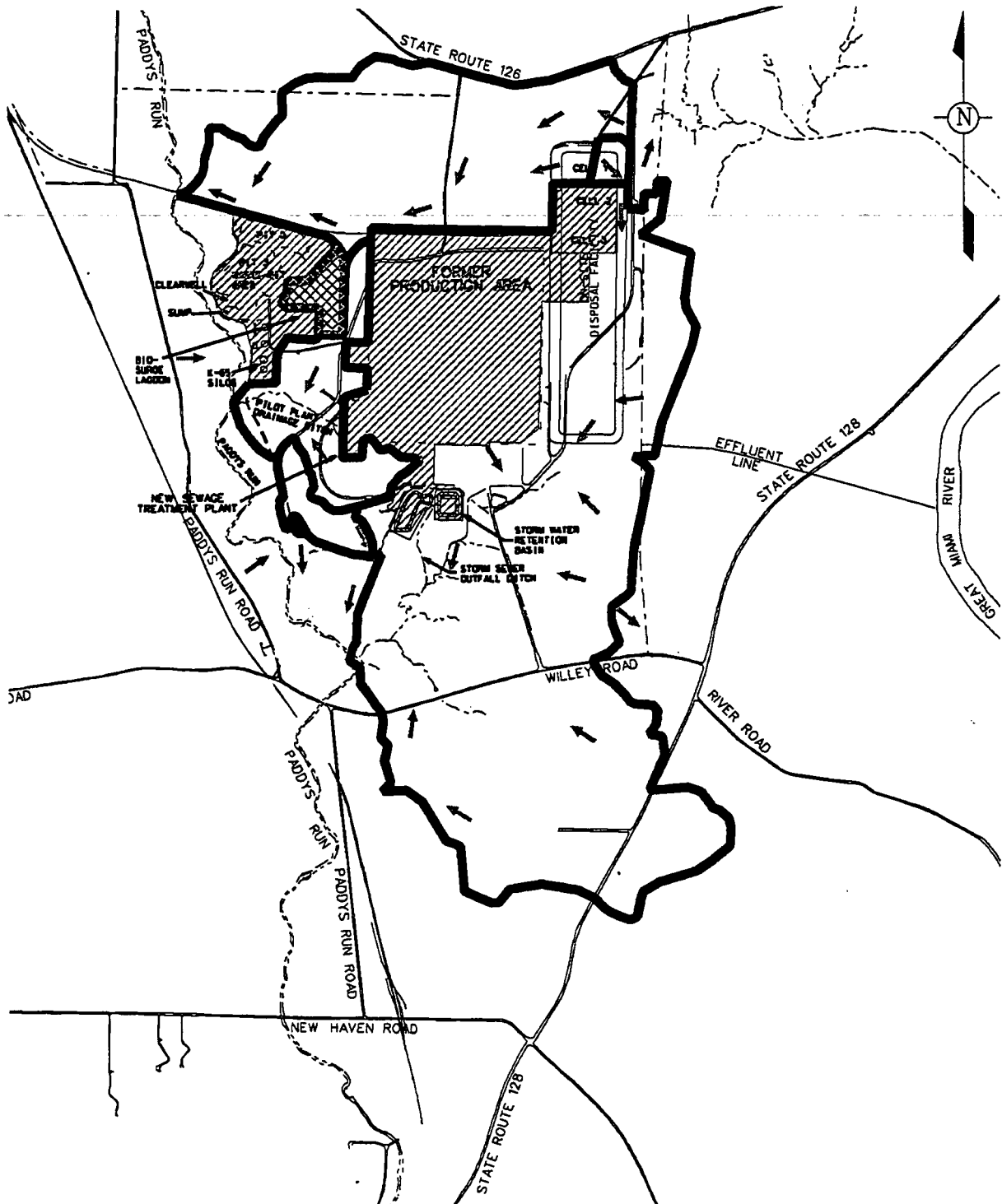


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CONTROLLED SURFACE WATER AREAS AND UNCONTROLLED RUNOFF FLOW DIRECTION



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SURFACE WATER / TREATED EFFLUENT

Uranium Released

- **1999: 419 pounds**
- **2000: 376 pounds**
 - ◆ **252 via treated effluent to Great Miami River**
 - ◆ **116 via uncontrolled runoff to Paddys Run**
 - ◆ **8 via Stormwater Retention Basin (SWRB) overflow**
- **2001: 474 pounds**
 - ◆ **353 via treated effluent to Great Miami River**
 - ◆ **121 via uncontrolled runoff to Paddys Run**

SURFACE WATER / TREATED EFFLUENT**Final Remediation Level (FRL)
Exceedances**

	<u>1999</u>	<u>2000</u>	<u>2001</u>
Surface water FRL exceedances for all constituents	2	9	7
Surface water benchmark toxicity value for all constituents	0	1	4
Surface water exceedances of groundwater total uranium	2	15	17

SURFACE WATER / TREATED EFFLUENT

National Pollutant Discharge Elimination System (NPDES) Compliance Rates

- **1999 compliance rate: >99 percent**
- **2000 compliance rate: >99 percent**
- **2001 complaince rate : >99 percent**
 - ◆ **12 at location 4001 (Parshall Plume)**
 - ◆ **7 at location 4601 (Sewage Treatment
Plant effluent)**

CHANGES FOR 2002 AND 2003

Surface Water Monitoring

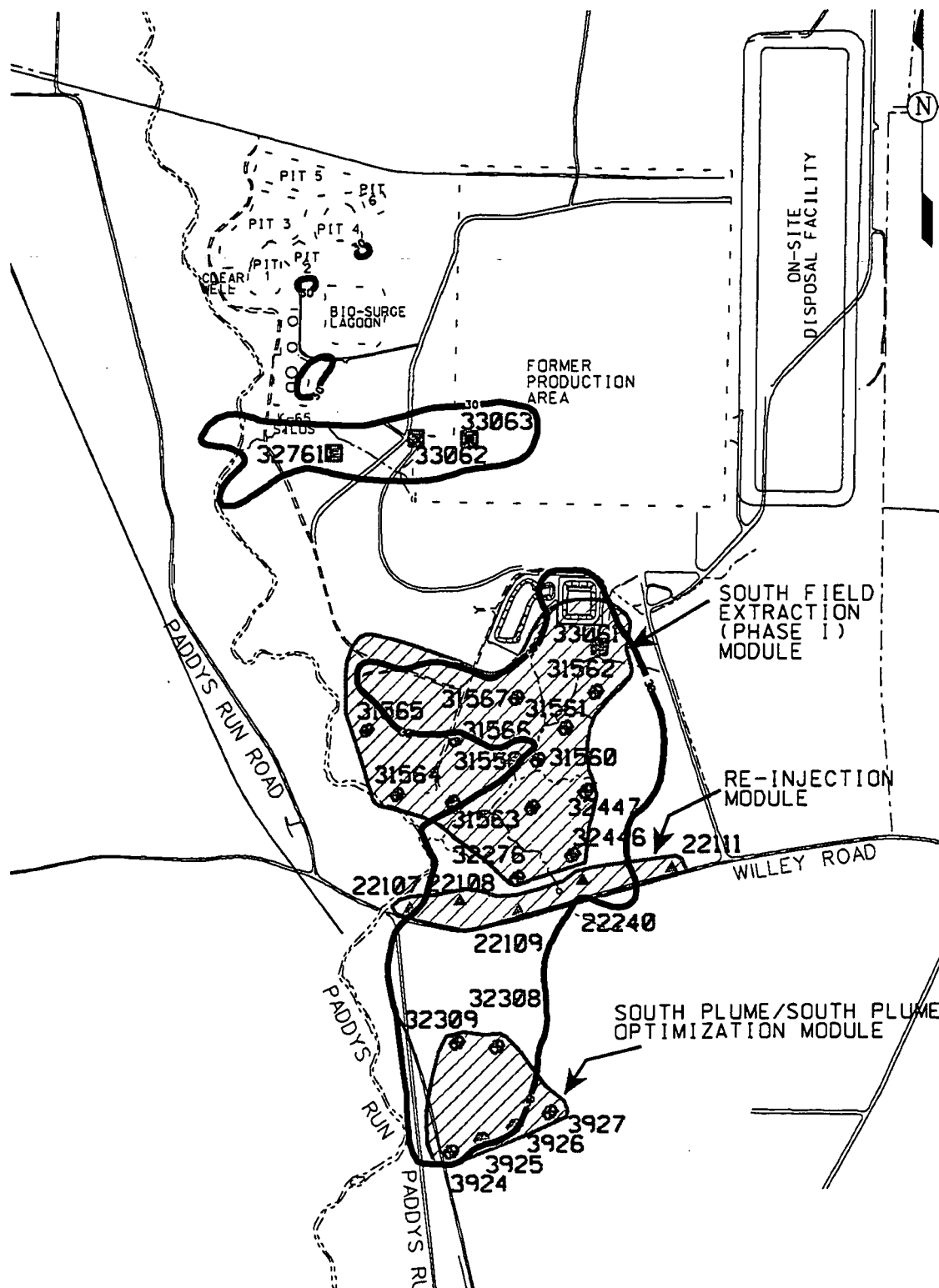
- Submitted NPDES permit renewal application April 30, 2002. OEPA indicated new permit issuance in spring 2003. Changes in monitoring will be made as needed based on the new permit.
- A reduction in monitoring parameters was approved by OEPA and US EPA and instituted in January 2002
 - Based on evaluation of data collected from August 1997 through December 2001 for parameters monitored due to sporadic FRL/BTV exceedances
 - ◆ Uranium monitoring at all locations continues and was unaffected by evaluation

GROUNDWATER MONITORING

2001 Program Changes

- **Adopted EPA-approved Safe Drinking Water Act Maximum Contaminant Level (30 ug/L) for uranium**
 - ◆ **Final remediation level for groundwater restoration**
 - ◆ **Uranium effluent discharge limit to Great Miami River**

CURRENT EXTRACTION AND REINJECTION WELLS FOR ENHANCED GROUNDWATER REMEDY



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GROUNDWATER MONITORING

2001 Program Changes

■ Waste Storage Area Module Phase I

- ◆ As part of this early start initiative completed installation of three new extraction wells in the Pilot Plant drainage ditch plume**
- ◆ These three wells began operating in May 2002, 16 months ahead of the OU5 RA work plan scheduled start date**

■ South Field Module

- ◆ Installed a new extraction well in the downgradient portion of the plume (operational May 2002)**
- ◆ Shut down two extraction wells (31564 and 31565) in the upgradient portion of plume where uranium concentrations are now less than the FRL**
- ◆ Continued pre-design characterization for Phase II of this module**

GROUNDWATER MONITORING

2001 Program Changes

■ Groundwater Reinjection

- ✦ Developed a new treatment to prevent well plugging; more effective**
 - All five reinjection wells treated and back on line in late 2001**
- ◆ Resumed long-term reinjection in three of five property boundary wells**
- ◆ Replacing two wells due to recurrent plugging and adding a sixth well in 2002**

GROUNDWATER MONITORING

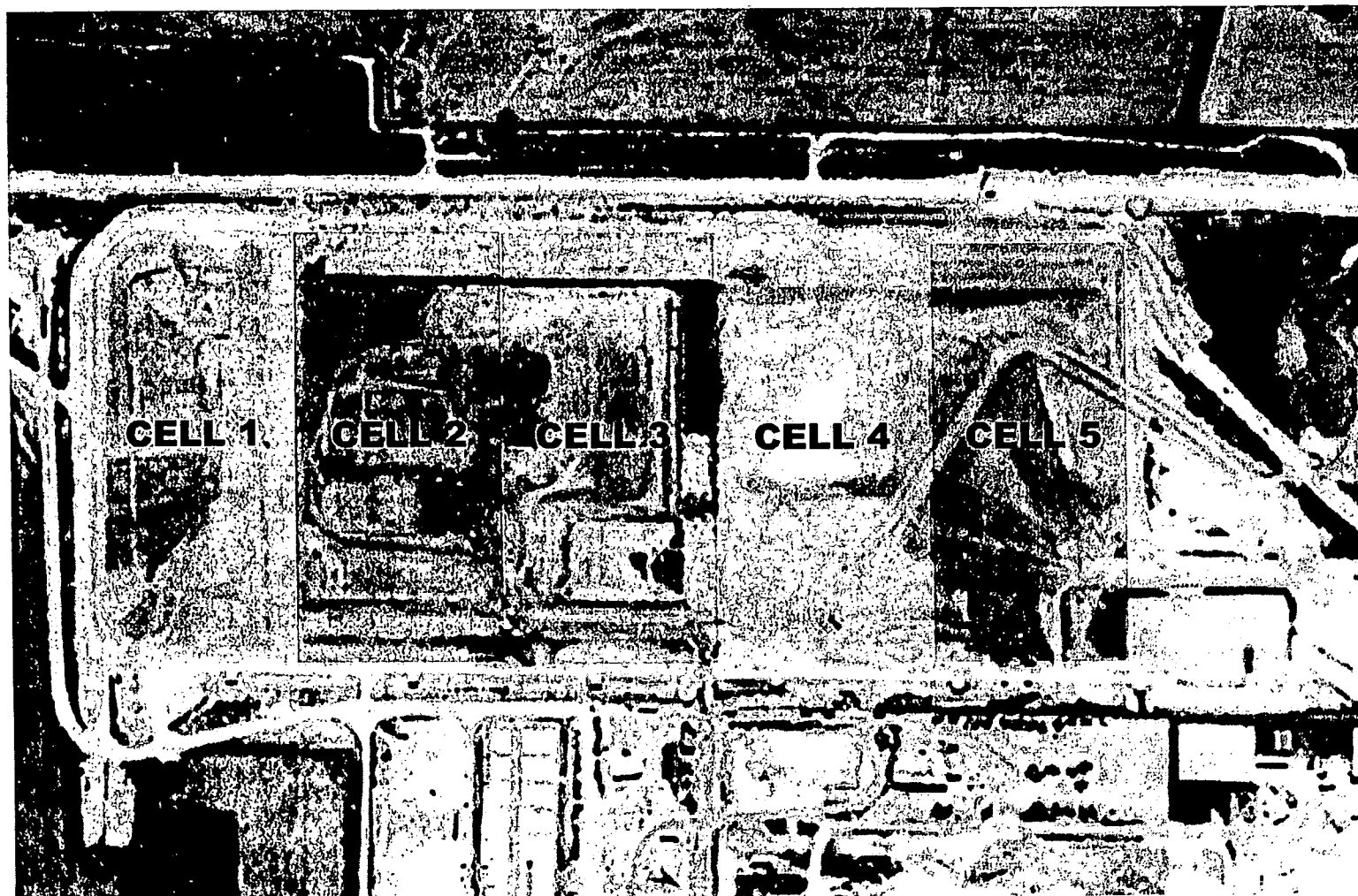
Operational Summary

	2000		2001	
	<u>Planned</u>	<u>Actual</u>	<u>Planned</u>	<u>Actual</u>
<i>Gallons pumped from Great Miami Aquifer</i>	1,787M	1,879M	1787M	1,861M
<i>Gallons Reinjected</i>	526M	299M	526M	147M
<i>Uranium removed from Great Miami Aquifer</i>	792 lbs.	845 lbs.	857 lbs.	867 lbs.

CHANGES FOR 2002 and 2003 GROUNDWATER MONITORING

- **Additional monitoring wells in Waste Storage Area**
- **Additional monitoring wells in South Field Area**
- **Start up of South Field Phase II Module**
 - ◆ **Three new extraction wells**
 - ◆ **One new injection well**
 - ◆ **One injection basin**
 - ◆ **One extraction well converted to an injection well**
- **Geoprobings in off-property portion of south plume (in support of Phase II design)**
- **Update monitoring program to focus more on recent FRL exceedances**

ON-SITE DISPOSAL FACILITY

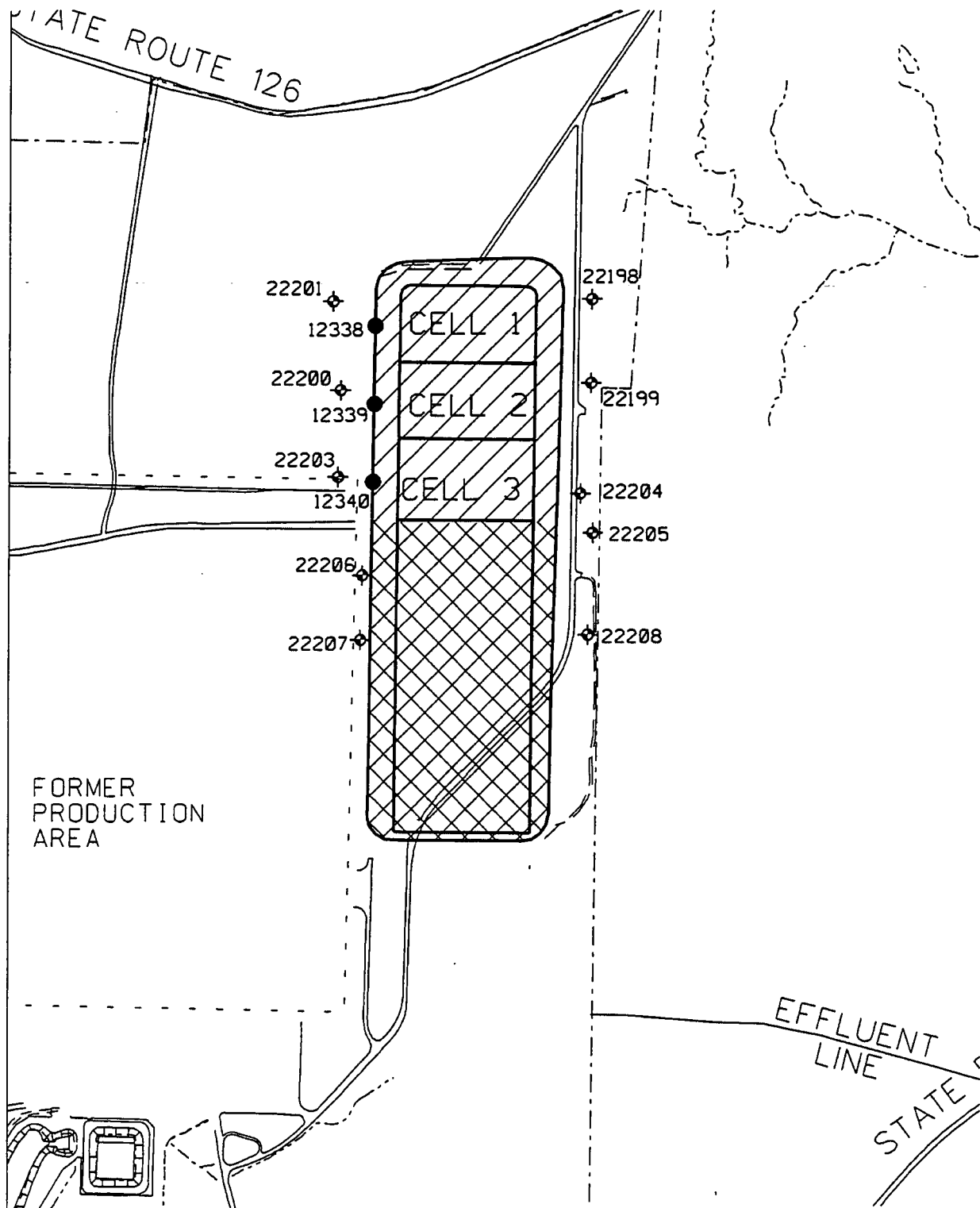


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OSDF FOOTPRINT AND MONITORING LOCATIONS

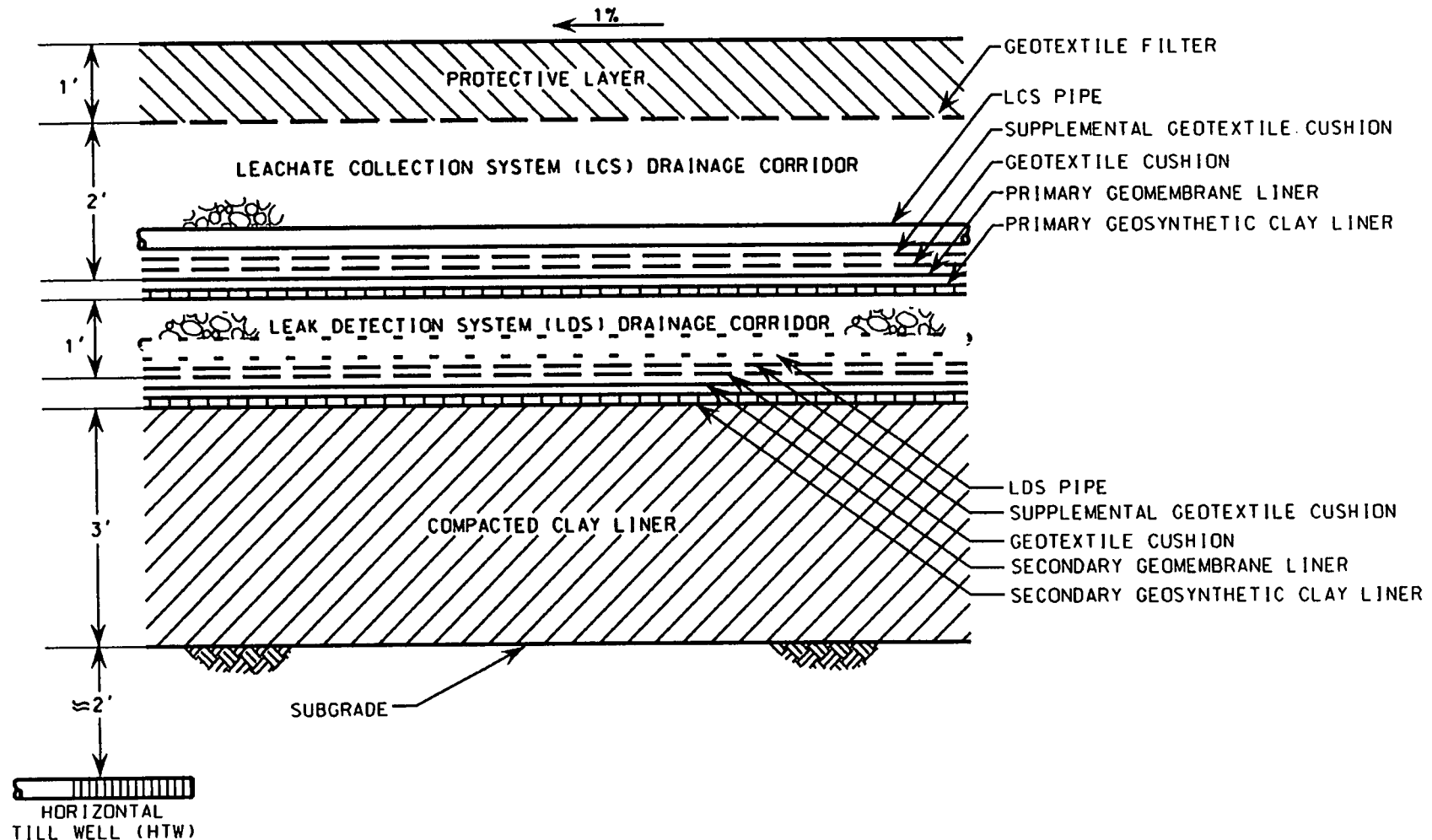


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ON-SITE DISPOSAL FACILITY LINER SYSTEM AT THE DRAINAGE CORRIDOR



ON-SITE DISPOSAL FACILITY (OSDF) MONITORING

Cell 1

- 100 percent filled
- Cap completed November 2001
- Leachate collection system total uranium concentrations
 - ◆ 1999: not detected to 102 ppb
 - ◆ 2000: 50 to 106 ppb
 - ◆ 2001: 60 to 142 ppb
- Leak detection system total uranium concentrations
 - ◆ 1999: 11.4 to 20.7 ppb
 - ◆ 2000: 6.0 to 15.4 ppb
 - ◆ 2001: 9.3 to 10.5 ppb
- Leak detection system accumulation rate (gallons-per-acre-per-day [gpad])
 - ◆ Maximum = 1.47
 - ◆ Minimum = 0.00
 - ◆ Average = 0.49
- Initial response leakage rate: 20 gpad

OSDF MONITORING

Cell 2

- **67 percent filled**
- **Leachate collection system total uranium concentrations**
 - ◆ **1999: 4.5 to 22.7 ppb**
 - ◆ **2000: 23.8 to 39.3 ppb**
 - ◆ **2001: 27.5 to 68.6 ppb**
- **Leak detection system total uranium concentrations**
 - ◆ **1999: 12 to 50 ppb**
 - ◆ **2000: 9.3 to 24.8 ppb**
 - ◆ **2001: 8.7 to 13.5 ppb**
- **Leak detection system accumulation rate:**
 - ◆ **Maximum = 2.09**
 - ◆ **Minimum = 0.00**
 - ◆ **Average = 0.54**
- **Initial response leakage rate: 20 gpad**

OSDF MONITORING

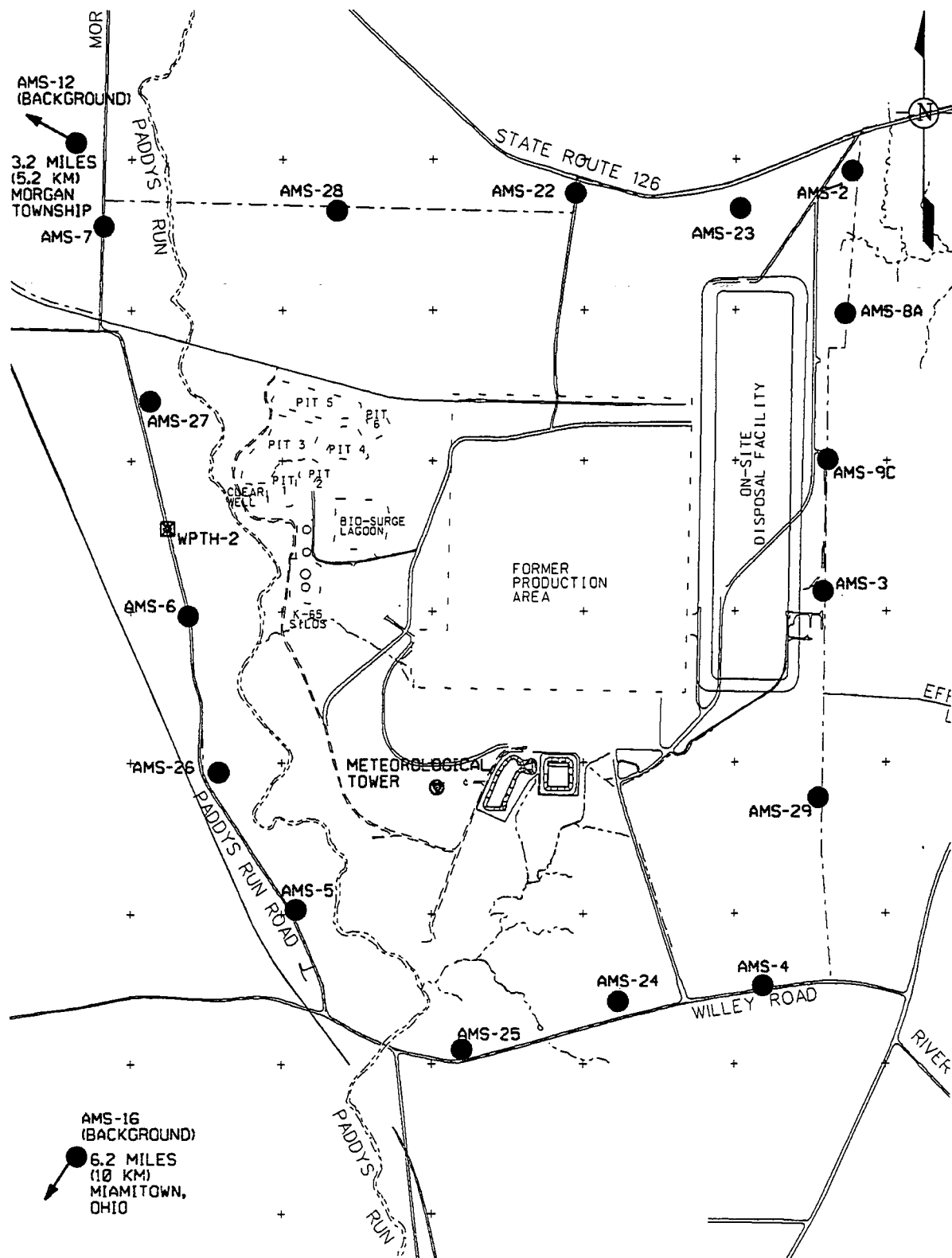
Cell 3

- **27 percent filled**
- **Leachate collection system total uranium concentrations**
 - ◆ **1999: 9.3 to 11.5 ppb**
 - ◆ **2000: 9.3 to 37.9 ppb**
 - ◆ **2001: 28.1 to 58.6**
- **Leak detection system**
 - ◆ **1999: dry**
 - ◆ **2000: dry**
 - ◆ **2001: dry**
 - ◆ **Initial response leakage rate: 20 gpad**

AIR MONITORING PROGRAM

- Particulate
- Radon
- Direct radiation

PARTICULATE AIR MONITORING LOCATIONS



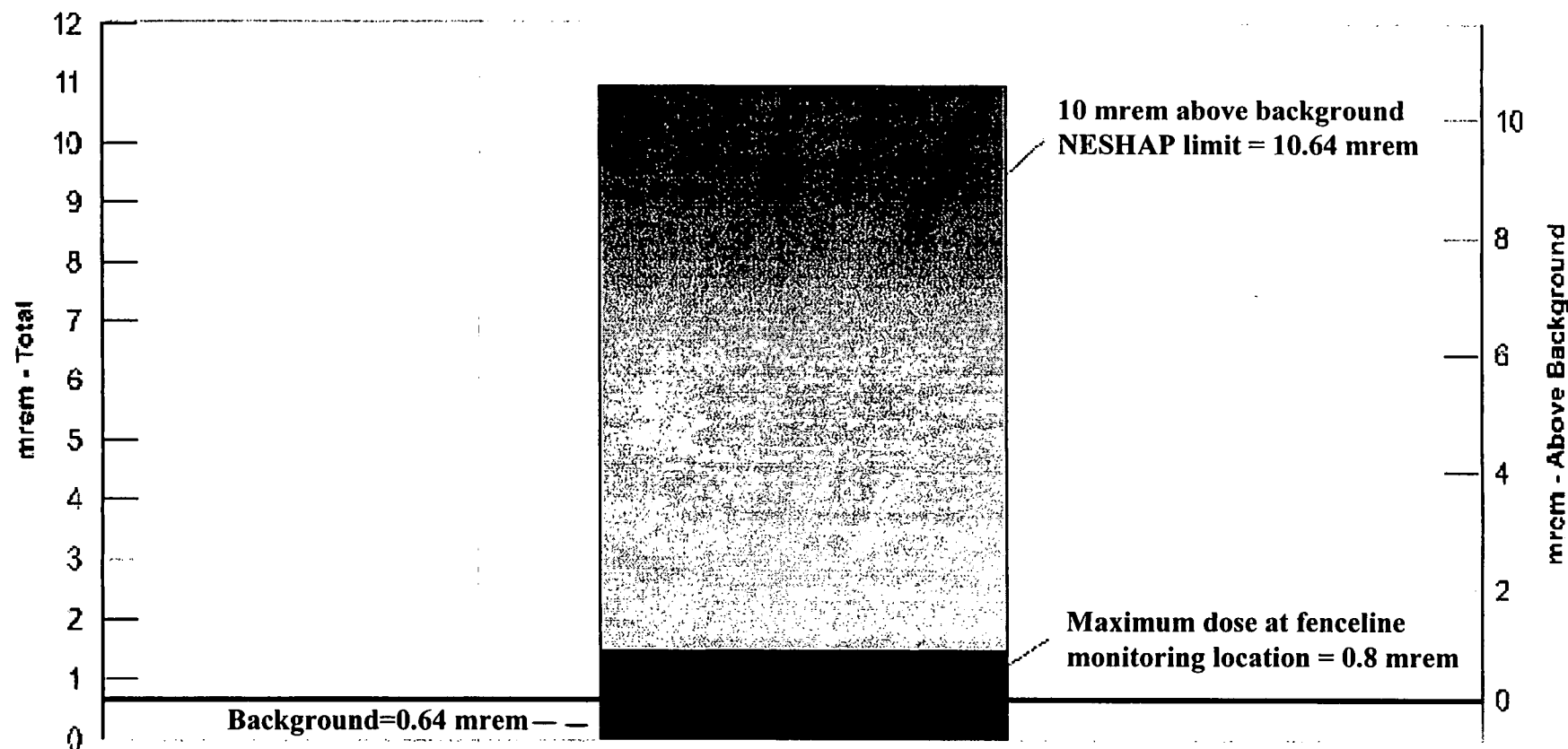
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AIR MONITORING PROGRAM

Particulate Monitoring

- **Dose from air particulate emissions: 0.8 mrem
(1.1 mrem in 2000)**
- **Maximum dose at AMS-3 (east fenceline)**
- **8 percent of National Emissions Standards
for Hazardous Air Pollutants (NESHAP) limit**

AIR INHALATION DOSE COMPARISON TO LIMIT AND BACKGROUND



AIR MONITORING PROGRAM

Particulate Monitoring

- **Slight decrease in thorium-230 concentrations at fenceline in 2001**
- **Continued biweekly thorium and uranium analysis at all fenceline locations**

AIR MONITORING PROGRAM

Particulate Monitoring

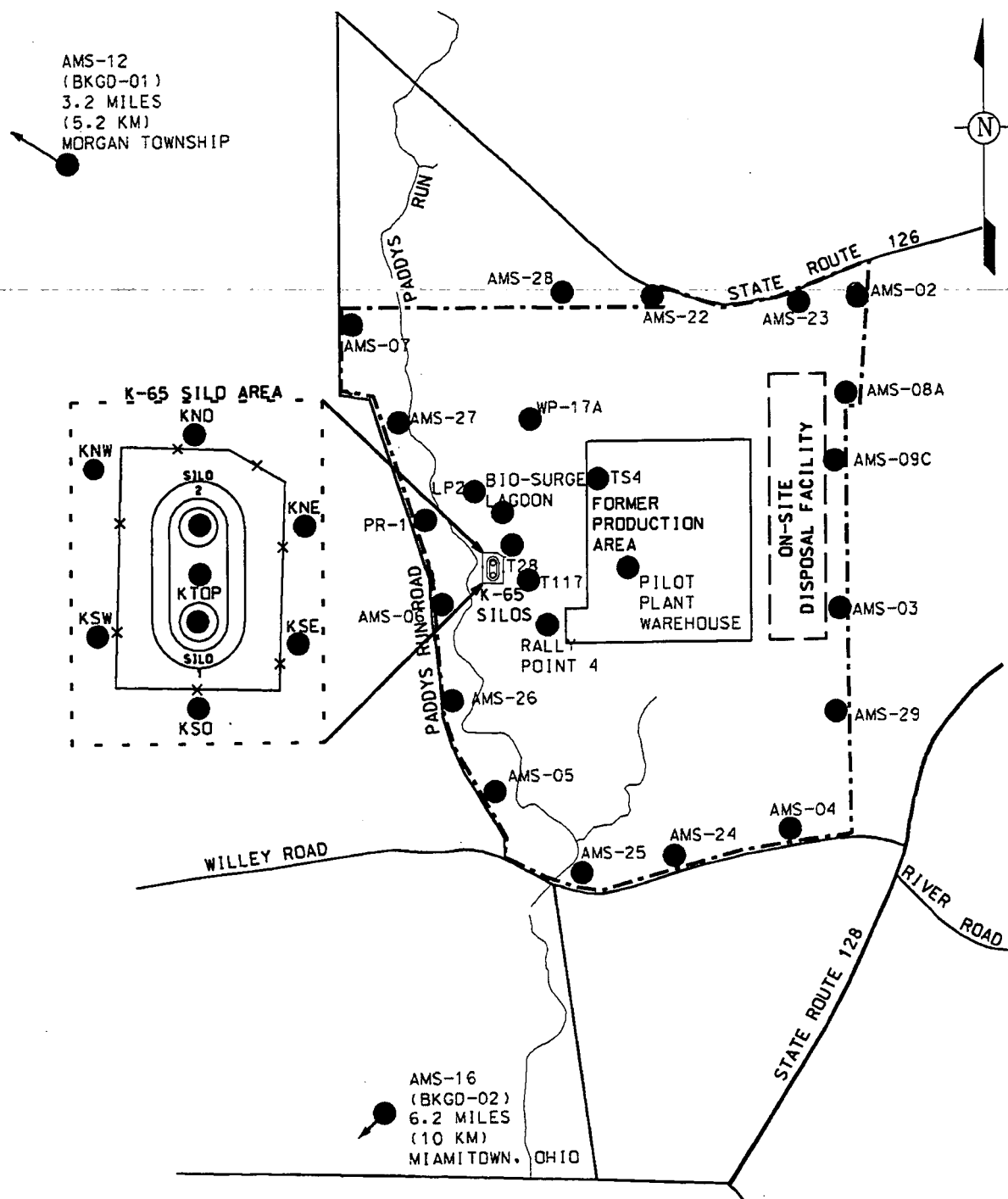
- **Fenceline monitoring results routinely reported to Waste Pits Remedial Action Project (WPRAP)**
- **Material processing at WPRAP is likely the largest contributor**
- **WPRAP has implemented further operational controls to limit emissions and decrease project impacts at the fenceline**
 - ◆ **Pug mill ventilation system (operating since April 2002)**

AIR MONITORING PROGRAM

Radon Monitoring

- Utilized continuous radon monitors (34 locations)
- Radon concentrations at Silos Project area during 2001 were comparable to concentrations in 2000
- Decrease since 1999 reflects the resealing of the silos in June of 1999
- Trend in radon levels inside Silos 1 and 2
- Radon at property line ranged from 0.2 - 0.4 pCi/L
- Property line results were well below the DOE standard (3 pCi/L as an annual average above background)

RADON MONITORING LOCATIONS

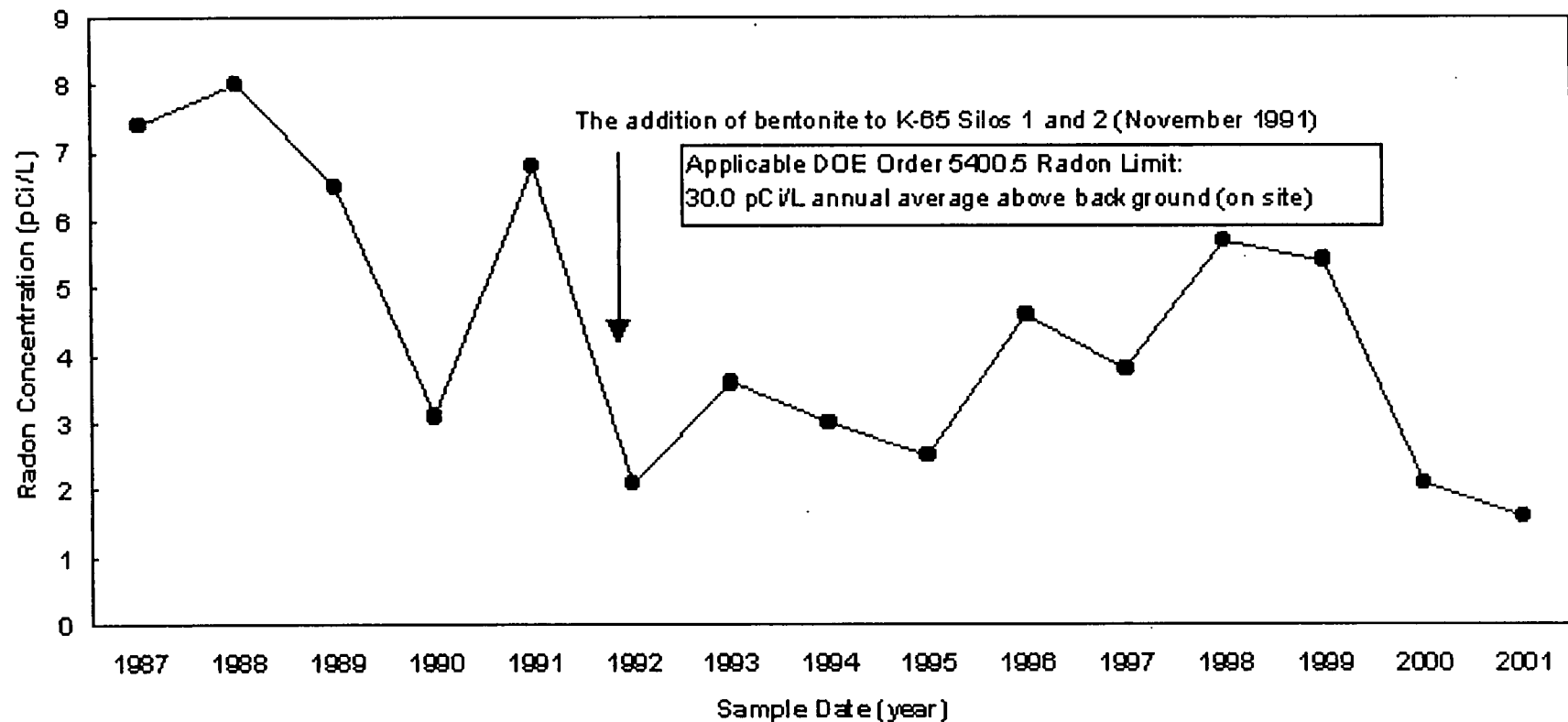


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ANNUAL AVERAGE RADON CONCENTRATIONS AT K-65 SILOS EXCLUSION FENCE, 1987-2001



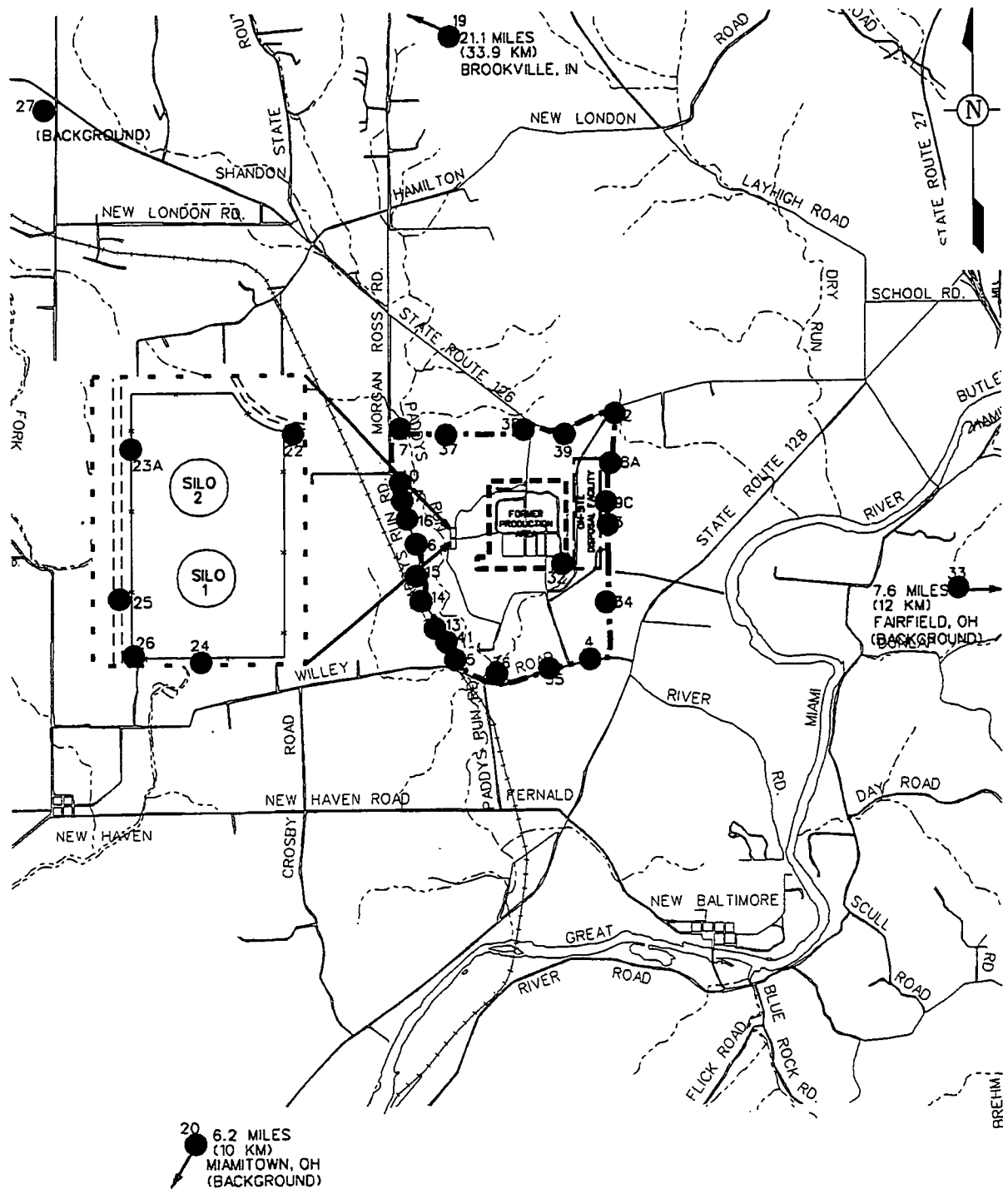
Note: The 1987 through 1996 data are based on the alpha track-etch detectors and averaging locations corresponding to continuous radon monitors. The 1997 through 2001 data are based on the average radon concentration from continuous radon monitors at the K-65 exclusion fence.

AIR MONITORING PROGRAM

Direct Radiation Monitoring

- **Direct radiation within Silos Project area (Silos 1 and 2) continues to increase**
- **Remains 49 percent lower than pre-bentonite cap in 1991**
- **Gradual increase at property line (AMS-6)**
- **Direct radiation is largest dose contributor to the maximally exposed individual member of the public**

DIRECT RADIATION MONITORING LOCATIONS

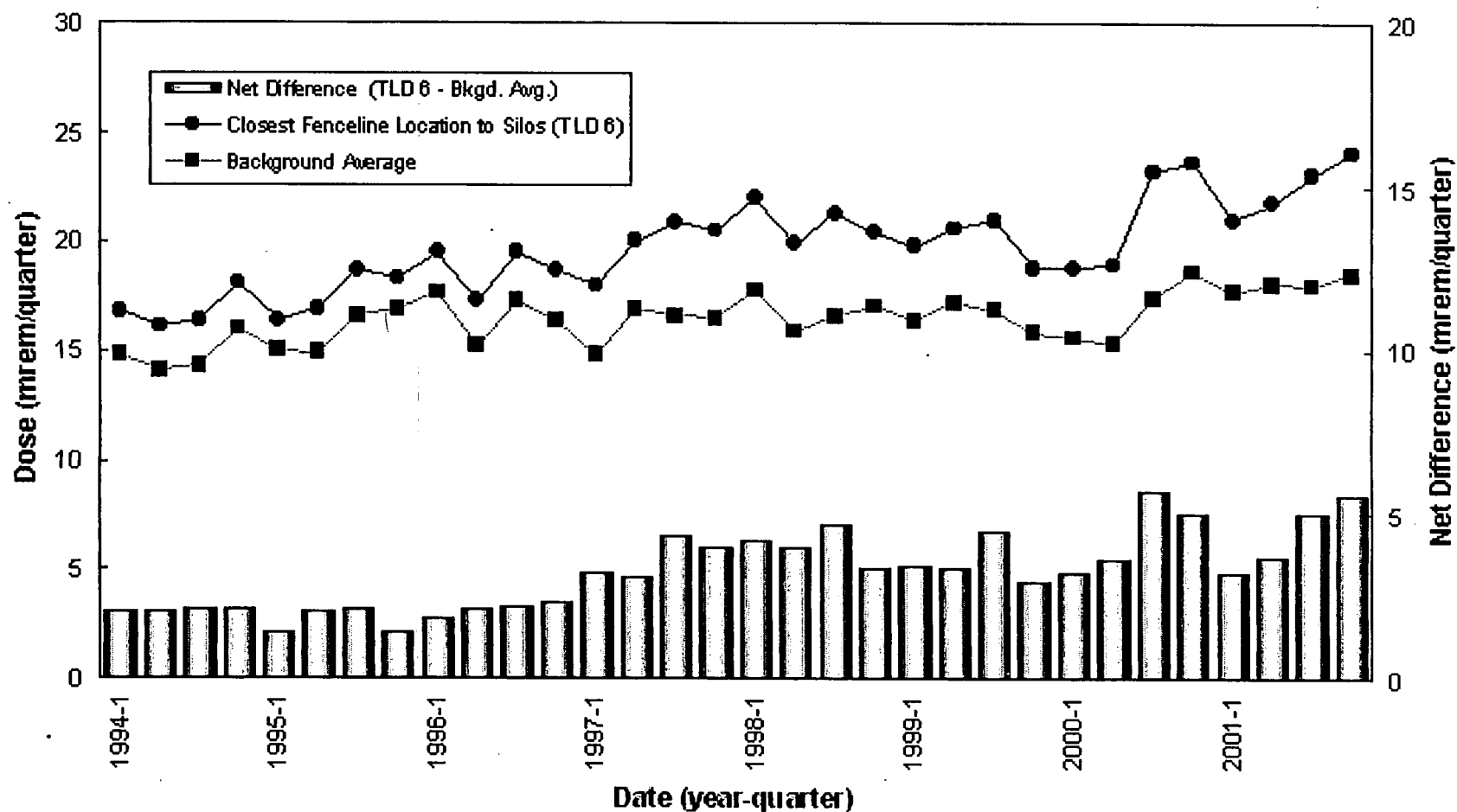


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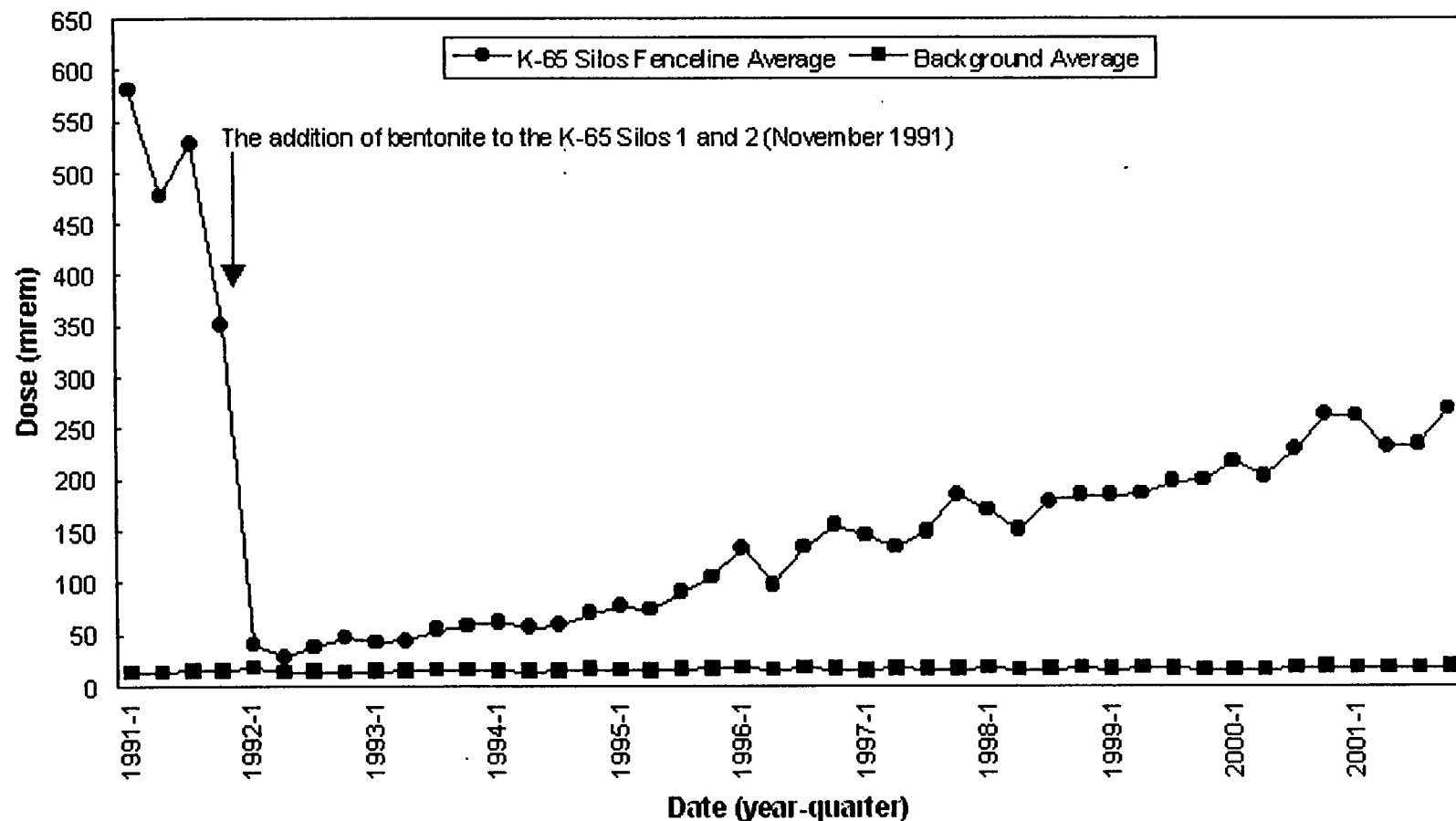
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DIRECT RADIATION (TLD) MEASUREMENTS 1994-2001 (LOCATION 6 VERSUS BACKGROUND AVERAGE)



DIRECT RADIATION (TLD) MEASUREMENTS AT K-65 SILOS BOUNDARY, 1991-2001 (K-65 SILOS FENCELINE AVERAGE VERSUS BACKGROUND AVERAGE)

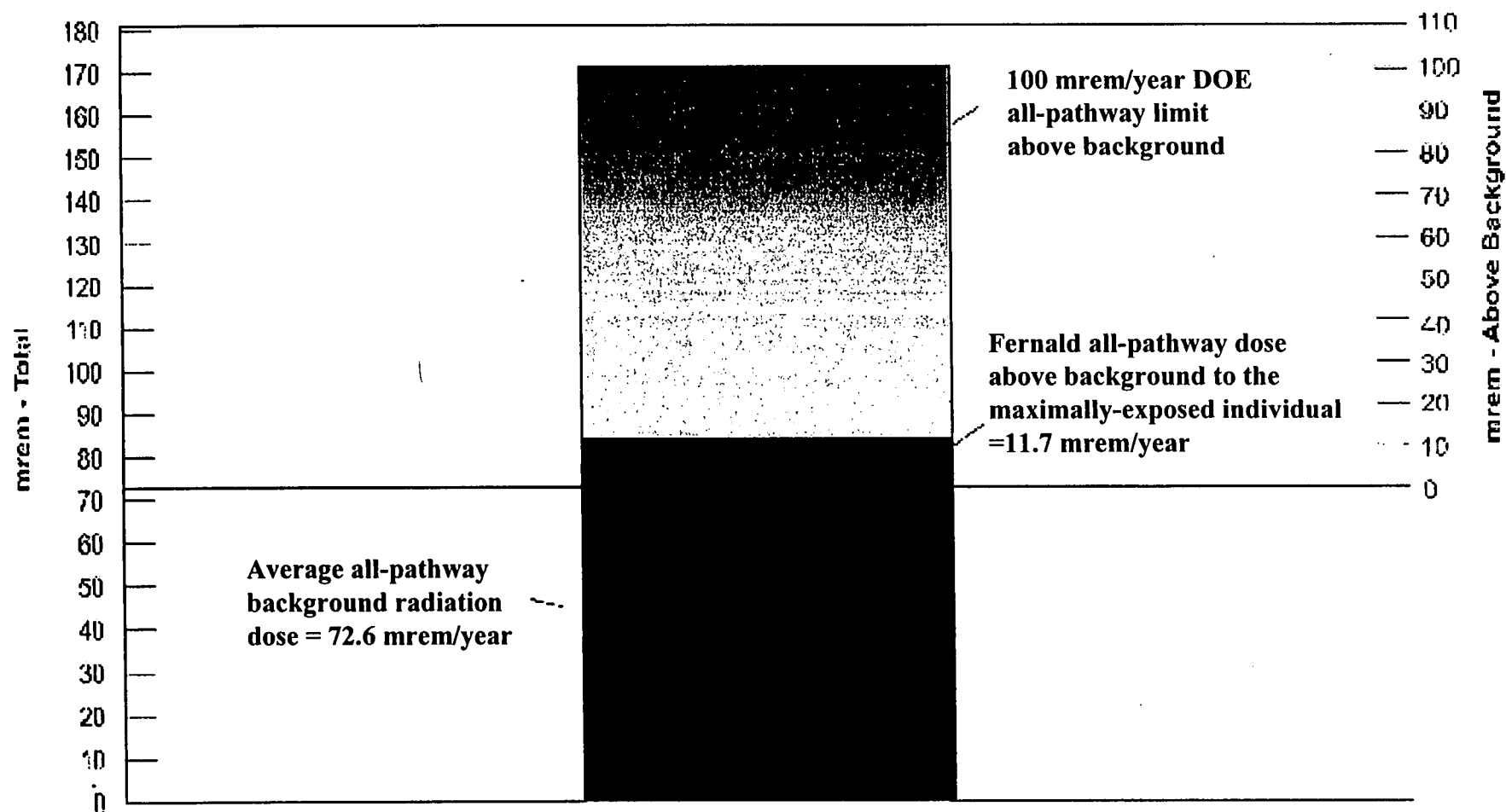


AIR MONITORING SUMMARY

Dose Comparison (mrem)

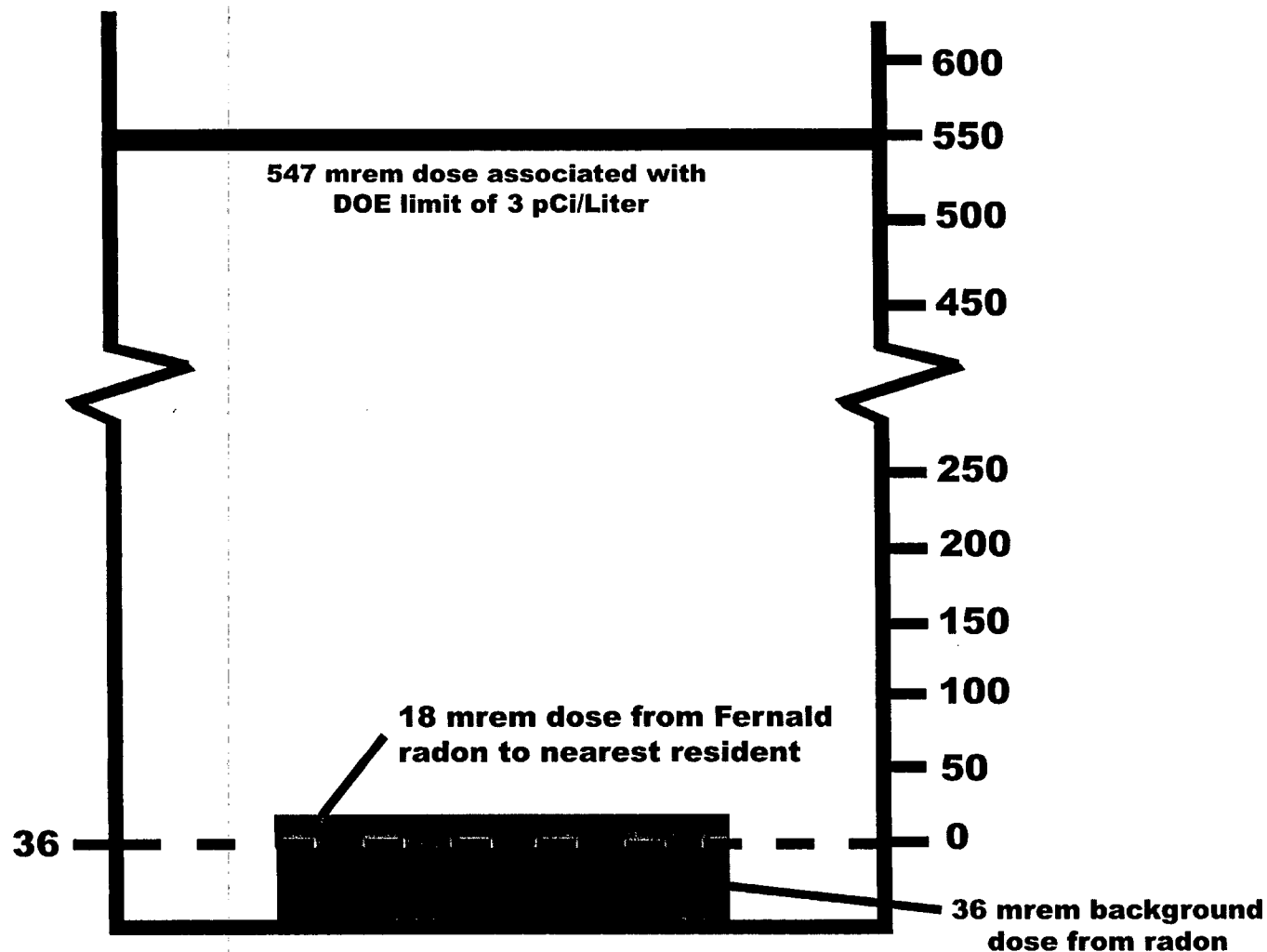
	<u>2000 RESULT</u> (Net above bkg.)	<u>2001 RESULT</u> (Net above bkg.)	<u>BACKGROUND</u> (per Fernald program)
<i>Particulate</i>	1.1	0.8	0.6
<i>Direct radiation</i>	10	11.5	72
<i>Produce</i>	0.9	---	---
<i>Maximally exposed individual</i>	11.2	11.7	72.6
<i>Radon</i> <i>(ICRP Method 65)</i>	36	18	36

ALL-PATHWAY RADIATION DOSE COMPARISON TO LIMIT AND BACKGROUND



^aIncludes dose from air particulate (0.2) and direct radiation (11.5)

RADON DOSE COMPARISON TO BACKGROUND



NOTE: The DOE order limit for radon is 3 pCi/Liter
(This is equivalent to 547 mrem using ICRP 65 method)

AIR MONITORING

Changes for 2002 and 2003

- **Real-time radon monitoring and reporting is now automated with a wireless data transmission system**
- **Relocate several monitors in silos area due to Accelerated Waste Retrieval construction**
- **Increased use of contract/off-site laboratory for air sample analyses**

NATURAL RESOURCES

Threatened and Endangered Species

- **Federally-endangered Indiana brown bat present in northern portion of Paddys Run**
- **State-threatened Sloan crayfish also present in northern Paddys Run**
- **Sloan crayfish survey conducted 2001**
- **Indiana brown bat survey planned per IEMP for 2002**

NATURAL RESOURCES

Turbidity Monitoring in Paddys Run

- **Monitoring drainage channel north of railroad track after rain events**
- **2001 results similar to previous years**
- **One instance of increased turbidity from the railyard sediment basin into Paddys Run**
- **Turbidity of short duration**
- **No impact on Sloan crayfish**
- **Discontinued monitoring in May 2002**

NATURAL RESOURCES

- **Impacted habitat areas**
 - ◆ **Cleared three acres of woods for remedial activities**

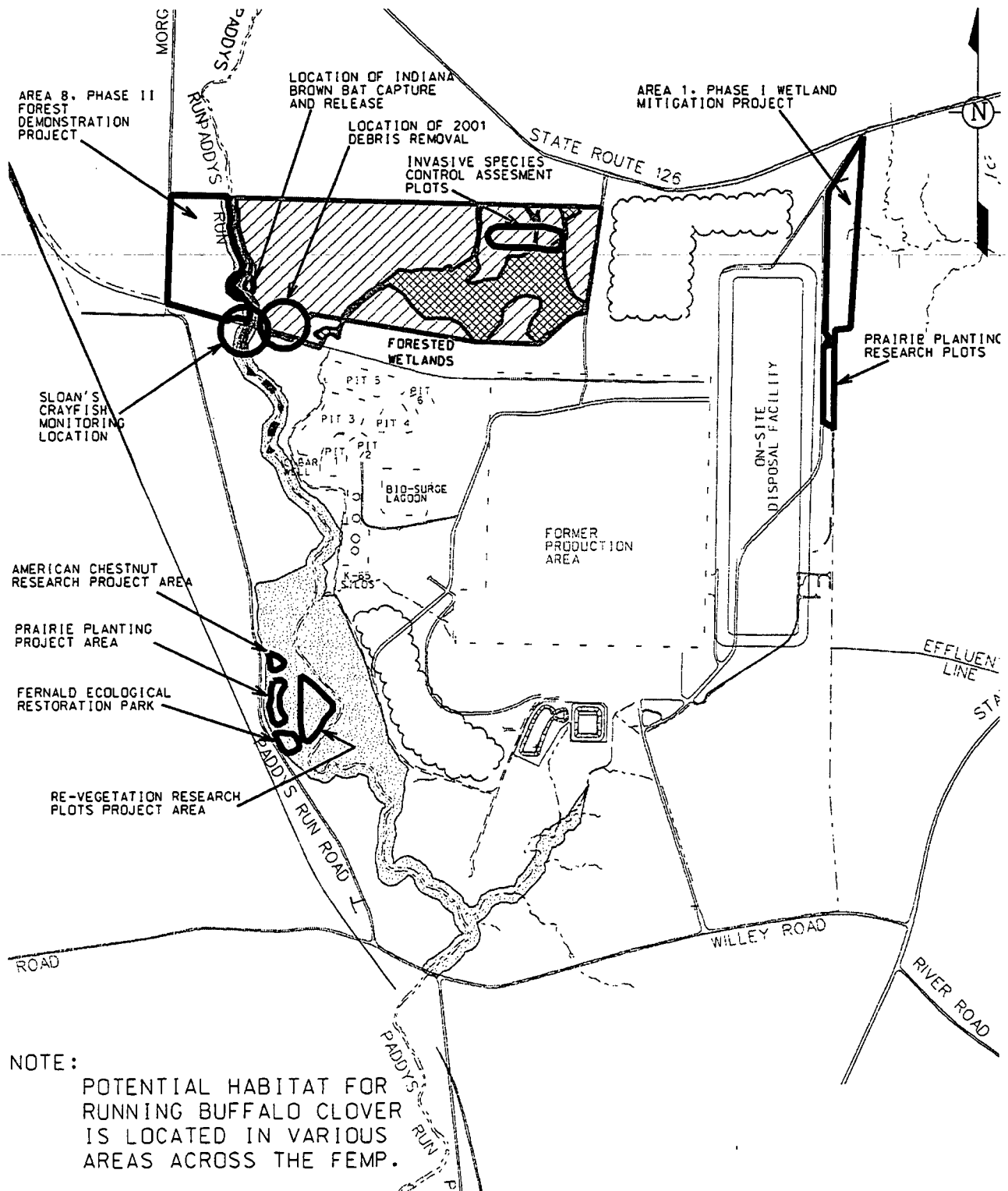
- **Ecological restoration activities**
 - ◆ **Completed Area 8, Phase II Forest Demonstration Project and initiated monitoring**
 - ◆ **Continued Wetland Mitigation Project monitoring**
 - ◆ **Conducted maintenance / management activities in restored areas**

NATURAL RESOURCES

Ecological Restoration Research

- **Invasive plant control research project with Ohio University**
- **Area 8, Phase I revegetation research plots project with Miami University**
- **Prairie plots project with University of Dayton**
- **American chestnut project with Miami University**

PRIORITY NATURAL RESOURCE AREAS



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